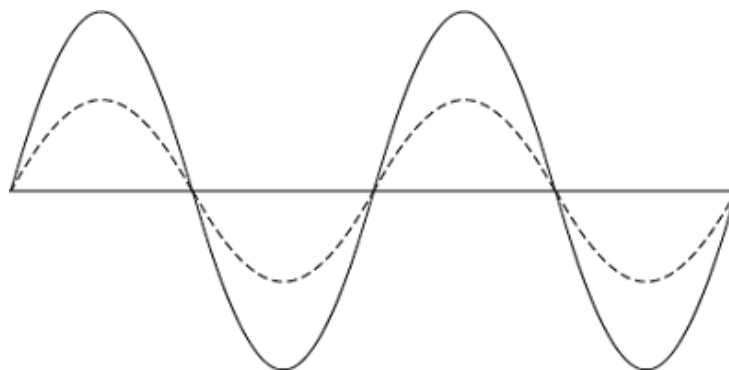


**Q1.** (a) **Diagram 1** shows two waves.

**Diagram 1**



- (i) Name **one** wave quantity that is the same for the two waves.

.....

(1)

- (ii) Name **one** wave quantity that is different for the two waves.

.....

(1)

- (iii) The waves in **Diagram 1** are transverse.

Which **one** of the following types of wave is **not** a transverse wave?

Draw a ring around the correct answer.

**gamma rays**

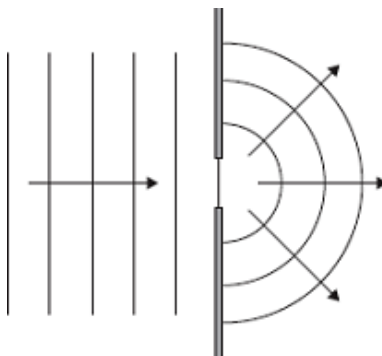
**sound**

**visible light**

(1)

- (b) **Diagram 2** shows water waves in a ripple tank moving towards and passing through a gap in a barrier.

**Diagram 2**



- (i) The water waves spread out after passing through the gap in the barrier.

What name is given to the process causing the waves to spread out?

.....

(1)

- (ii) Every second, 8 waves pass through the gap in the barrier. The waves have a wavelength of 0.015 metres.

Calculate the speed of the water waves and give the unit.

Use the correct equation from the Physics Equations Sheet.

.....

.....

.....

Speed = .....

(3)

**(Total 7 marks)**

- Q2.** (a) Scientists have observed that the wavelengths of the light from galaxies moving away from the Earth are longer than expected.

- (i) What name is given to this observation?

.....

(1)

- (ii) Draw a ring around the correct answer to complete each sentence.

This observation gives scientists evidence that

light can be stretched.

galaxies are changing colour.

the Universe is expanding.

(1)

- (iii) There is a pattern linking the size of the observed increase in the wavelengths of light from a galaxy and the distance the galaxy is from the Earth.



Which **one** of the graphs, **L**, **M** or **N**, shows the correct pattern?

Write the correct answer in the box.

(1)

- (b) Observations help scientists answer questions about the Universe.

Scientists **cannot** answer every question.

Which **one** of the following questions **cannot** be answered by scientists?

Tick (✓) **one** box.

How old is the Universe?

☐

Why was the Universe created?

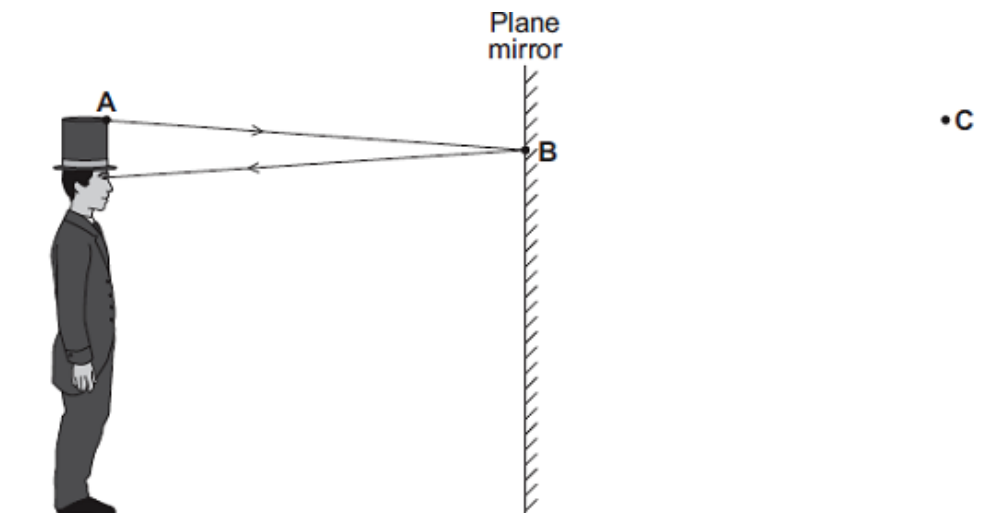
☐

How fast does light travel through the Universe?

☐

(1)  
(Total 4 marks)

**Q3.** A person can see an image of himself in a tall plane mirror.



The diagram shows how the person can see his hat.

- (a) Which point, **A**, **B** or **C**, shows the position of the image of his hat?

Write the correct answer, **A**, **B** or **C**, in the box.

(1)

- (b) On the diagram, use a ruler to draw a light ray to show how the person can see his shoe.

(3)

- (c) Which **one** of the words in the box is used to describe the image formed by a plane mirror?

Draw a ring around the correct answer.

imaginary	real	virtual
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(1)

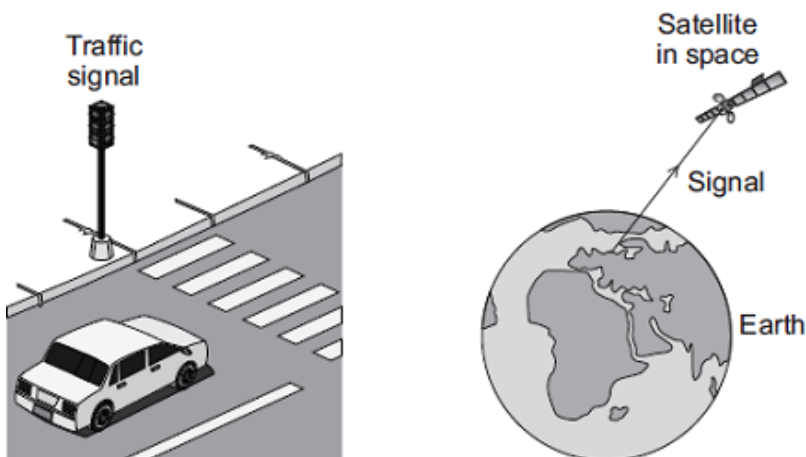
(Total 5 marks)

**Q4.** **Diagram 1** shows four of the seven types of wave in the electromagnetic spectrum.

**Diagram 1**

<b>J</b>	<b>K</b>	<b>L</b>	Visible light	Infrared	Microwaves	Radio waves
----------	----------	----------	---------------	----------	------------	-------------

- (a) The **four** types of electromagnetic wave named in **Diagram 1** above are used for communication.



- (i) Which type of electromagnetic wave is used when a traffic signal communicates with a car driver?

.....

(1)

- (ii) Which type of electromagnetic wave is used to communicate with a satellite in space?

.....

(1)

- (b) Gamma rays are part of the electromagnetic spectrum.

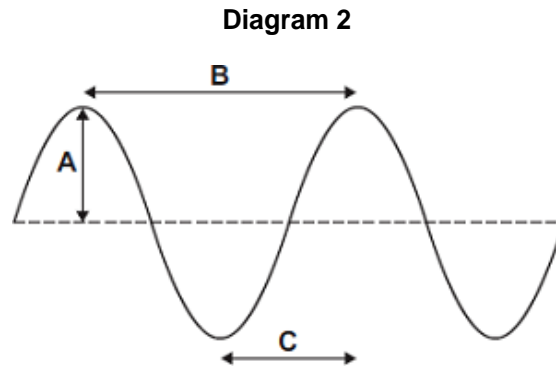
Which letter, **J**, **K** or **L**, shows the position of gamma rays in the electromagnetic spectrum?

Draw a ring around the correct answer.

**J**                      **K**                      **L**

(1)

- (c) **Diagram 2** shows an infrared wave.



- (i) Which **one** of the arrows, labelled **A**, **B** or **C**, shows the wavelength of the wave?

Write the correct answer, **A**, **B** or **C**, in the box.

(1)

- (ii) Draw a ring around the correct answer to complete the sentence.

The wavelength of infrared waves is

shorter than  
the same as  
longer than

the wavelength of radio waves.

(1)

- (d) Mobile phone networks send signals using microwaves. Some people think the energy a person's head absorbs when using a mobile phone may be harmful to health.

- (i) Scientists have compared the health of people who use mobile phones with the health of people who do not use mobile phones.

Which **one** of the following statements gives a reason why scientists have done this?

Tick (✓) **one** box.

To find out if using a mobile phone is harmful to health.

☐

To find out if mobile phones give out radiation.

☐

To find out why some people are healthy.

☐

(1)

- (ii) The table gives the specific absorption rate (SAR) value for two different mobile phones.

The SAR value is a measure of the maximum energy a person's head absorbs when a mobile phone is used.

Mobile Phone	SAR value in W/kg
<b>X</b>	0.28
<b>Y</b>	1.35

A parent buys mobile phone **X** for her daughter.

Using the information in the table, suggest why buying mobile phone **X** was the best choice.

.....

.....

.....

.....

(2)  
(Total 8 marks)

